

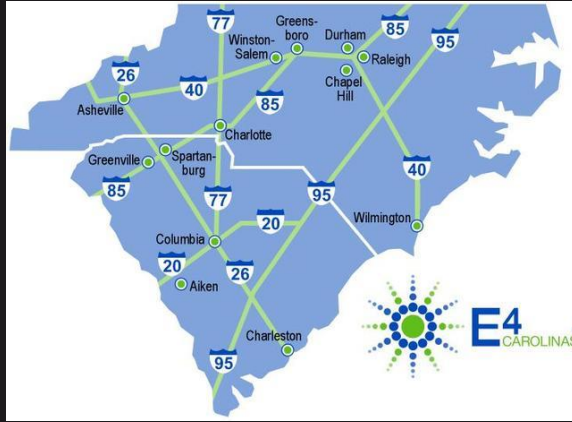


Believed to be the largest and most  
diverse in the Eastern United States:

**An Innovation Leader**

# North Carolina's Energy Economy

• Energy • Economy • Environment • Efficiency •



## Economic Development

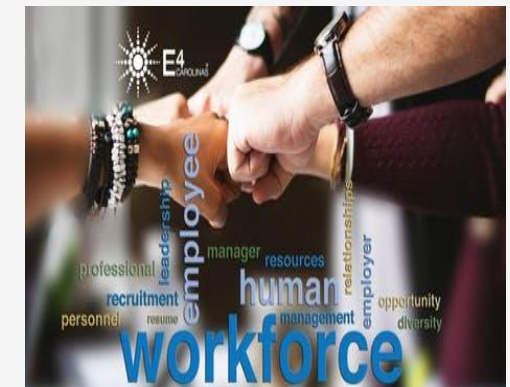
## Innovation



## Policy



## Networking

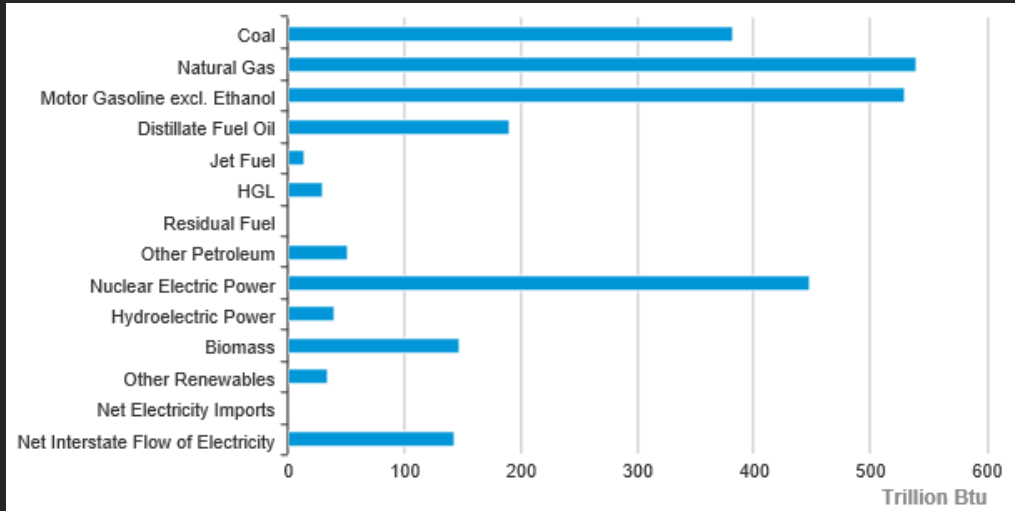


## Workforce

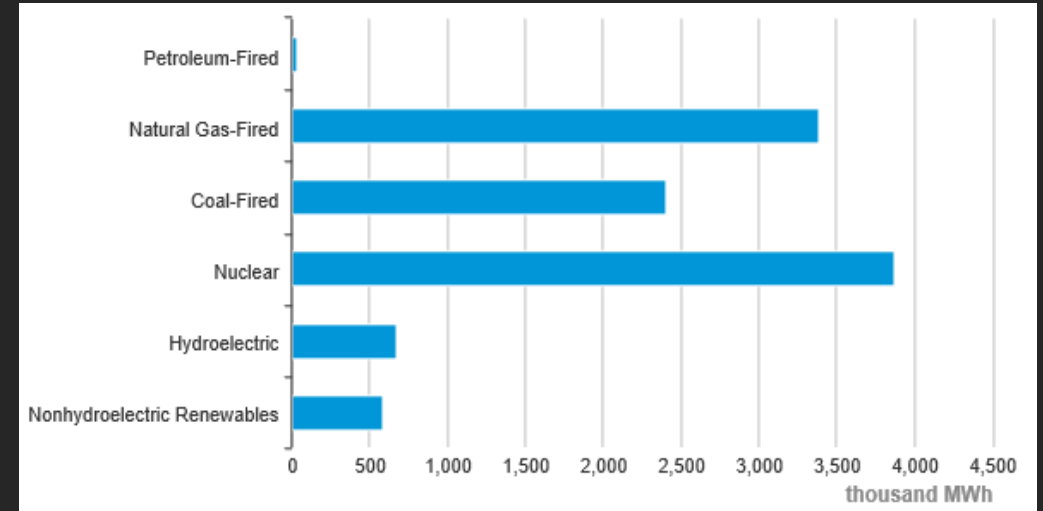
## E4 Carolinas

- Trade association for **ALL** Carolina energy
- 140+ full members/118 associate members
  - All North Carolina utilities are members
- Creating value for Carolina Energy Economy
  - Economic Development
  - Innovation
  - Policy
  - Networking
  - Workforce

# North Carolina Energy Profile



Consumption



Fuel for Electricity

Rank	State	Total Energy Consumed per Capita (million Btu)
1	Louisiana	897
18	South Carolina	333
31	Virginia	277
33	Georgia	275
37	North Carolina	251

Consumption Per Capita

Rank	State	Total Carbon Dioxide Emissions (million metric tons)
1	Texas	657.4
2	California	363.3
3	Florida	231.3
4	Pennsylvania	218.6
5	Louisiana	210.3
6	Ohio	207.4
7	Illinois	205.2
8	Indiana	182.9
9	New York	164.6
10	Michigan	152.6
11	Georgia	137.0
12	Kentucky	124.6
13	North Carolina	121.2

Carbon Production

# Nuclear Energy Leadership



State	Dec. 2018 MW Capacity	% of US Total Nuclear MW	% of State Power MW
Illinois	8,855	12.4%	57%
Pennsylvania	7,626	10.6%	39%
South Carolina	4,510	6.3%	56%
New York	3,988	5.6%	35%
Alabama	3,952	5.5%	33%
North Carolina	3,875	5.4%	35%

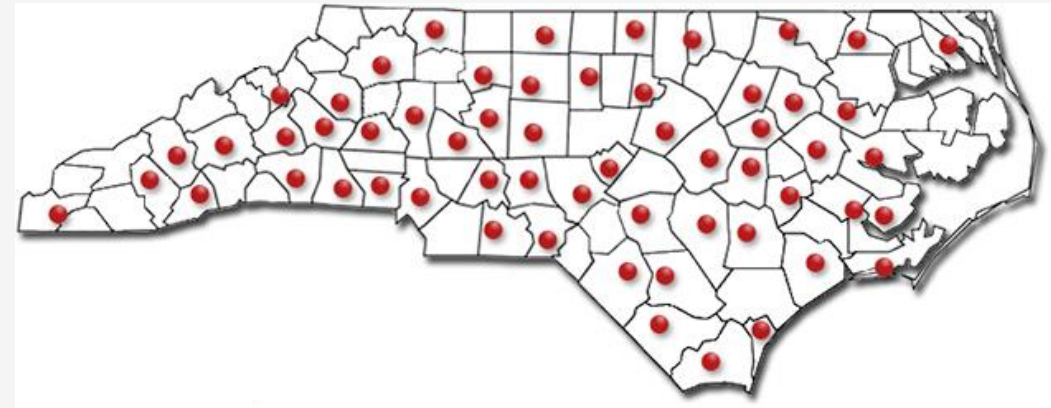
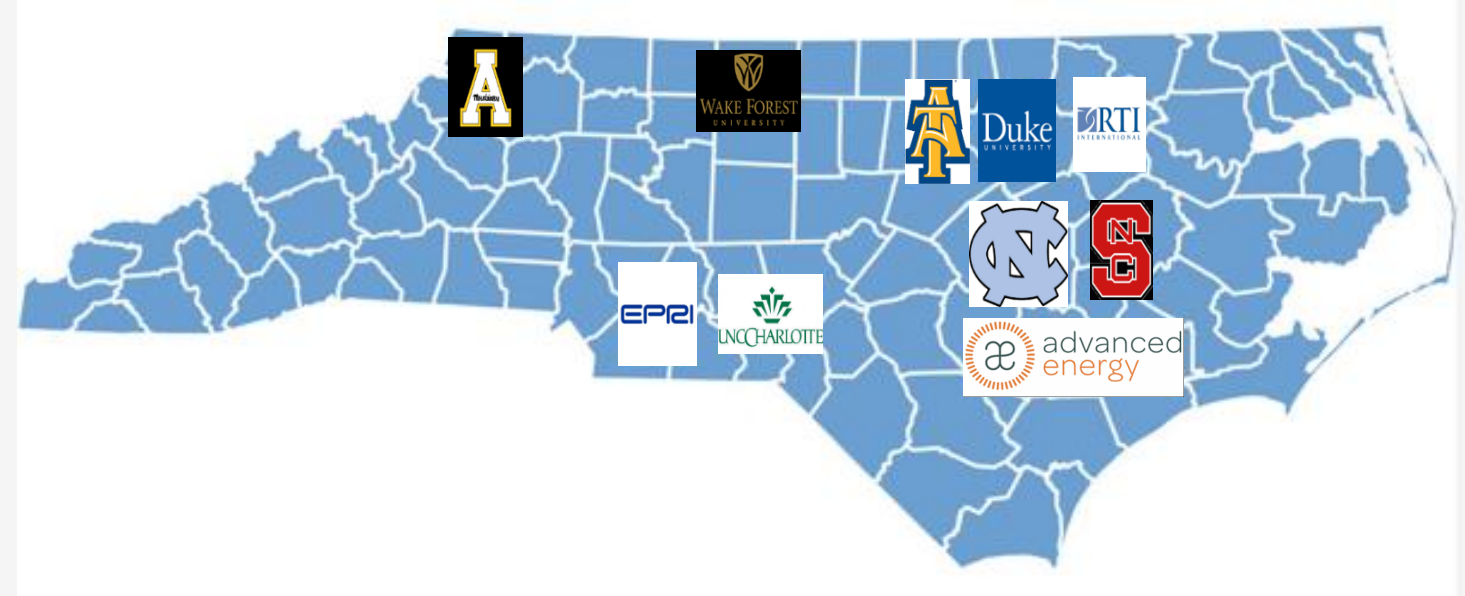
## A national and global nuclear energy leader

- Policy built an industry
- Sixth in U.S. nuclear generating capacity
- 3,875,000 MWh consumed (35.4% of NC supply)
- 7,424 MW generating capacity (~92% load factor)
- 4 plants with 7 reactors
- Leading nuclear workforce and service industry



- [illegible]

# Energy Research Leadership



## Energy Research & Education

- U.S. leading energy research universities
  - NC investments in energy research
  - Emerging research areas
- Community College – industry support





## Manufacturing & Engineering

- Global leading manufacturers
- Global leading EPC companies

## Energy Manufacturing & Engineering Leadership



**SIEMENS**

**wood.**

**B&W**



**framatome**

**ZACHRY**

**BURNS  
MCDONNELL**

**TOSHIBA**  
Leading Innovation >>>

**HDR**

**SENSUS**  
a xylem brand



**HITACHI**

**ABB**

**IR** Ingersoll Rand



**BLACK & VEATCH**  
Building a world of difference.

**AECOM**



**Westinghouse**

**ATKINS**

Member of the SNC-Lavalin Group

**FLUOR.**



## Energy Innovation & Policy Fuel Economic Development

- Increased products & services sold
- Job growth
- New ventures created
- New companies attracted to NC

## Energy Innovation Leadership

### Examples of Solving Critical World Energy Problems



**Net Power** (Durham) – Developer of revolutionary carbon-capture power generation technology, based on the Allum Cycle



**Albemarle** (Charlotte) – A world leader in the development and distribution the lithium chemicals and products essential for devices and EVs



**Atom Power** (Charlotte) – Developer of the world's first solid state circuit breaker, which makes structure's electrically safe and programmable



**NuScale Power** (Wilmington/Charlotte) – recipient of over \$50 million in DOE funding for a leading SMR design.

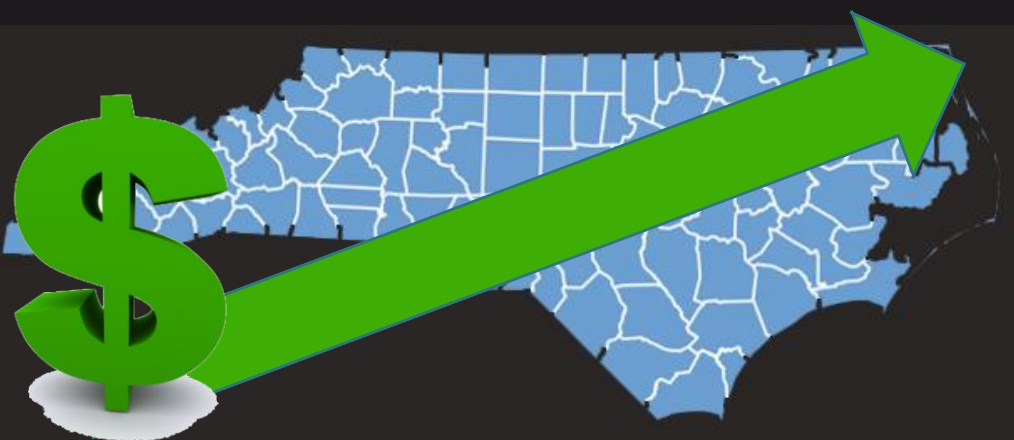


**Tokai Carbon** (Charlotte) – The nation's leader in developing and distributing of carbon and graphite products essential for steel and Li-on batteries



**Ingersoll Rand** (Davidson) – A global leader in building efficiency and energy storage technologies





## Economic Opportunity

- Energy Storage
- Grid Technology
- Advanced/Next Generation Nuclear
- Advanced EPC
- Transportation Electrification

## Creating Value with Development Clusters

**Energy Storage** – North Carolina is a leader with 25+ companies and organization in the national/global supply chain (E4 Carolinas, 2018)

**Grid Technology** – North Carolina is THE leader with 100+ companies and organizations in the national/global supply chain. (RTI International, 2017)

**Advanced/Next Generation Nuclear** – North Carolina is a leader with 100+ companies and organizations in the national/global supply chain (E4 Carolinas & Nuclear Energy Institute, 2016)

**Advanced Engineering, Procurement & Construction** – More than a dozen Global caliber and nearly 100 national/regional firms.

**Transportation Electrification** – Similar to solar energy opportunity a decade ago.



## Energy Innovation Initiative

- 2 year collaboration with NC DOC Office of Science, Technology & Innovation
- 50+ energy innovation professionals
- All energy sectors/supply chain members
- Issues/solutions summits + work groups
- Produced Energy Innovation Plan

## Essential to Expanding our Energy Economy

### First Step to Energy Innovation Leadership

- Complete the energy industry inventory
  - Confirm/identify clusters of opportunity
  - Determine our national/global leadership opportunities
- Foster increased collaboration/value creation
  - Connect research, technology, innovators and capital
  - Increase entrepreneurship and commercialization
- Develop our energy brand
- Promote our energy industry based on fact

### E4 Carolinas Starting “First Step”

- Inventory started – 1,000+ Carolina companies/organizations
- Staff added
- Additional funding needed to execute



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# North Carolina's Energy Economy



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Partner, Pillsbury Law



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CEO, E4 Carolinas